


## Precision Ultra Low Phase Noise OCXO in 36x27 mm “Europack” with optional Adapter to 2”x2”

 ESD Sensitive 36.1 x 27.2 x 19.05 mm  
Datasheet #0837A

### Features

- SC-cut crystal
- High Stability
- Ultra Low Aging
- Ultra Low Phase Noise
- Sine Wave or HCMOS/TTL output

### Applications

- Instrumentation
- Telecommunication Systems
- Data Communications
- GPS
- COTS/Dual use


### Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	Vcc	12V supply 5V supply	-0.5 -0.5		13.0 5.5	V	
Storage temper.	Ts		-50		90	°C	
Control Voltage	Vc		-1 -5		5.5 5	V	Slope option “P” Slope option “N”

### Electrical (4\*)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Frequency	F		20		100	MHz	
Frequency Stability	$\Delta F/F$	vs. Temp.		$\pm 10$		ppb	See chart below
		vs. Supply		0.2	0.3	ppb/10%/Vcc	
Aging		per day per year, first year second year		5E-10 1E-7 3E-8			after 30 days 5E-8 available
		per day per first year Following years		1E-10 2E-8 1E-8			Option 01 Option 01 Option 01
Allan Deviation		.1s to 1s		1E-12			PN grade “U”
SSB Phase Noise of 10MHz reference. Values at actual operating frequency are higher by approximately $20\text{Log}N$ ( $N=F, \text{MHz}/10$ ) at all frequency offsets from the carrier (achieved after 10 minutes warm-up). Example: for F=50 MHz at 10 Hz offset of the standard version $S_{\phi} = -126\text{dBc}/\text{Hz}$	$S_{\phi}$	1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-110 -140 -155 -162 -170 -172	dBc/Hz	Standard version, Option L
		1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-112 -145 -158 -165 -170 -172	dBc/Hz	Premium version, option P

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### Electrical (cont.)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
SSB Phase Noise of 10MHz reference continued	S $\phi$	1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-115 -146 -158 -165 -170 -172	dBc/Hz	Ultimate version, Option U 2*
		1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-120 -148 -160 -168 -170 -173		Extraordinary version, Option E, available with slope options N or L
SSB Phase Noise, F = 100.000 MHz	S $\phi$	1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-90 -120 -135 -142 -150 -152	dBc/Hz	Standard version, option L
		1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-92 -125 -138 -145 -150 -152		Premium version, option P
		1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-95 -126 -138 -145 -150 -152		Ultimate version, option U 2*
		1Hz 10Hz 100Hz 1KHz 10KHz 100KHz			-100 -128 -140 -148 -150 -153		Extraordinary version, Option E, available with slope options N or L
Retrace		After 30 minutes			±10	ppb	24 Hours off 3*
G-sensitivity		worst direction			±10	ppb/G	
Input Voltage	V <sub>cc</sub>		4.75 11.4	5.0 12.0	5.25 12.6	V	See chart below to specify
Power consumption, Still air	P	steady state, 25°C steady state, -30°C start-up @ -30°C		1.0 1.7 2.5	1.4 3.2	W	Standard Operating Temperature 1*
Spectral Purity		Sub-harmonics Spurious Harmonics/Sine		-50 -35	-80 -30	dBc	
Load		10KOhm//15pF (HCMOS/TTL), AC-coupled 50 Ohm (Sine-wave)					Output Code T Output Code S
Warm-up time	$\tau$	to 0.1ppm accuracy		3	5	minutes	
Output Waveform		HCMOS/TTL compatible or Sinewave					
Output Power			+5	+10		dBm	Output Code S

Phase Noise values are converted back to 10 MHz reference. Values at actual frequency are higher by approximately 20LogN (N = F, MHz/10) at all frequency offsets from the carrier

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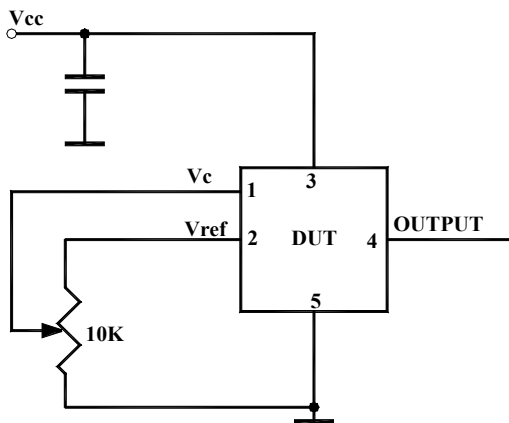
## Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Logic 1 (CMOS)	Voh		0.9 Vref			V	Output Code T
Logic 0 (CMOS)	Vol				0.1 Vref	V	Output Code T
Control voltage	Vc		0 -4.0 0		Vref 4.0 10	V	Slope option “P” Slope option “N” Slope option “L”
Input impedance	Zin	At Vc pin	10			KOhm	
Modulation bandwidth	Fm		DC		1	KHz	*5
Reference Voltage	Vref	Vcc = 12V Vcc = 5V		5 or 4.5 4.5		V	
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	±0.3 ±0.4	±0.5 ±0.6		ppm	Slope option “P” Slope option “N”
Deviation slope		Monotonic, positive Monotonic, negative Monotonic, positive		1.0/Vref -0.13 -0.12		ppm/V	Slope option “P” Slope option “N” Slope option “L”
Setability	Vc0	@25°C, Fnom.  No internal bias for slope option “L”		Vref/2 ± 0.5 0 ± 0.5 5 ± 0.5		V	Slope option “P” 3* Slope option “N” Slope option “L”


## Environmental and Mechanical

Parameter	Description
Operating temp. range	-30°C to 70°C Standard, Other options – see chart below
Mechanical Shock	Per MIL-STD-202, 30G, 11ms
Vibration	Per MIL-STD-202, 5G to 2000 Hz
Soldering Conditions	260°C for 10s Max leads only

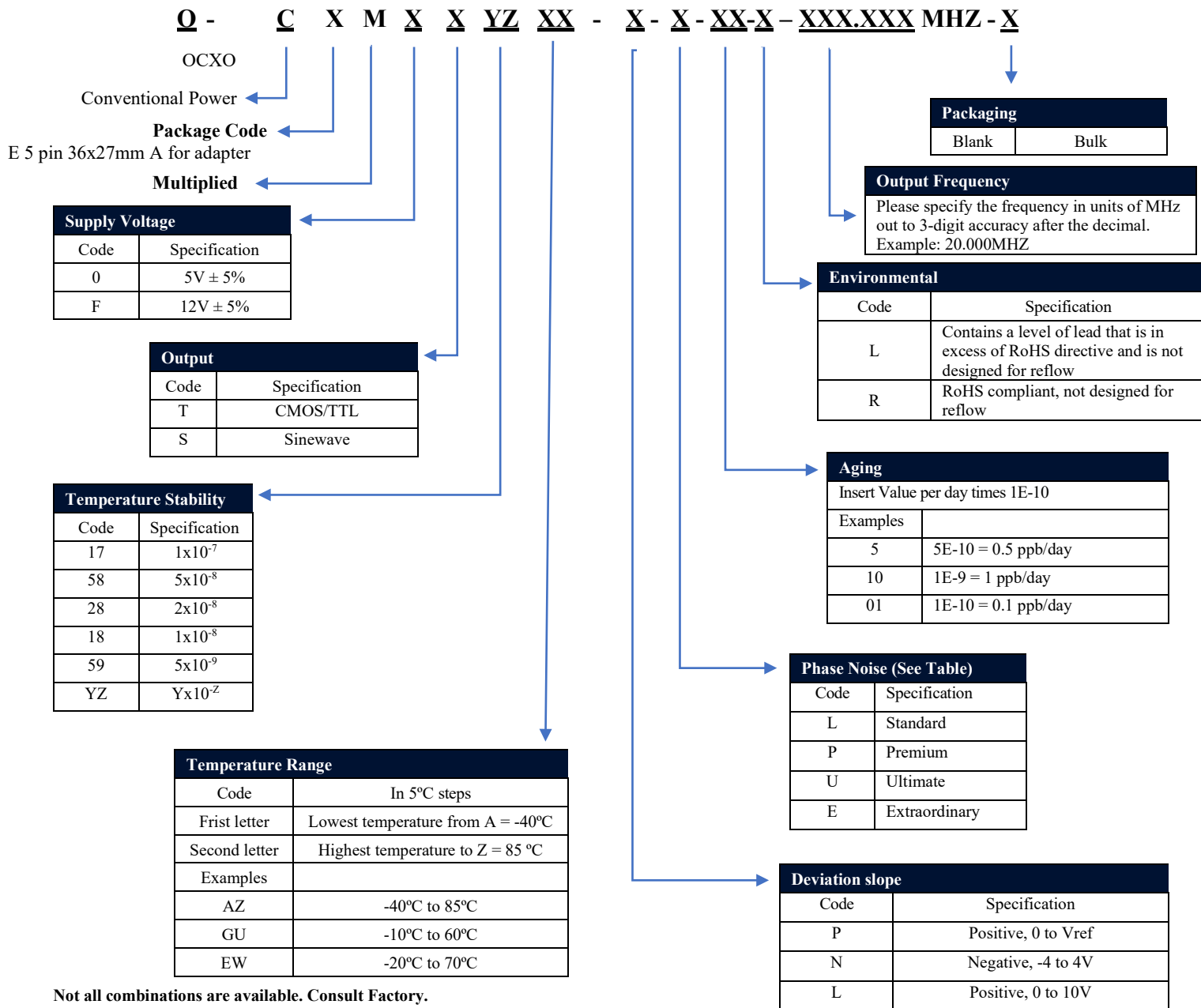
## Test Circuit



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## Creating a Part Number



### Temperature Code Table

Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	F	-15	K	10	P	35	U	60	Z	85
B	-35	G	-10	L	15	Q	40	V	65		
C	-30	H	-5	M	20	R	45	W	70		
D	-25	I	0	N	25	S	50	X	75		
E	-20	J	5	O	30	T	55	Y	80		

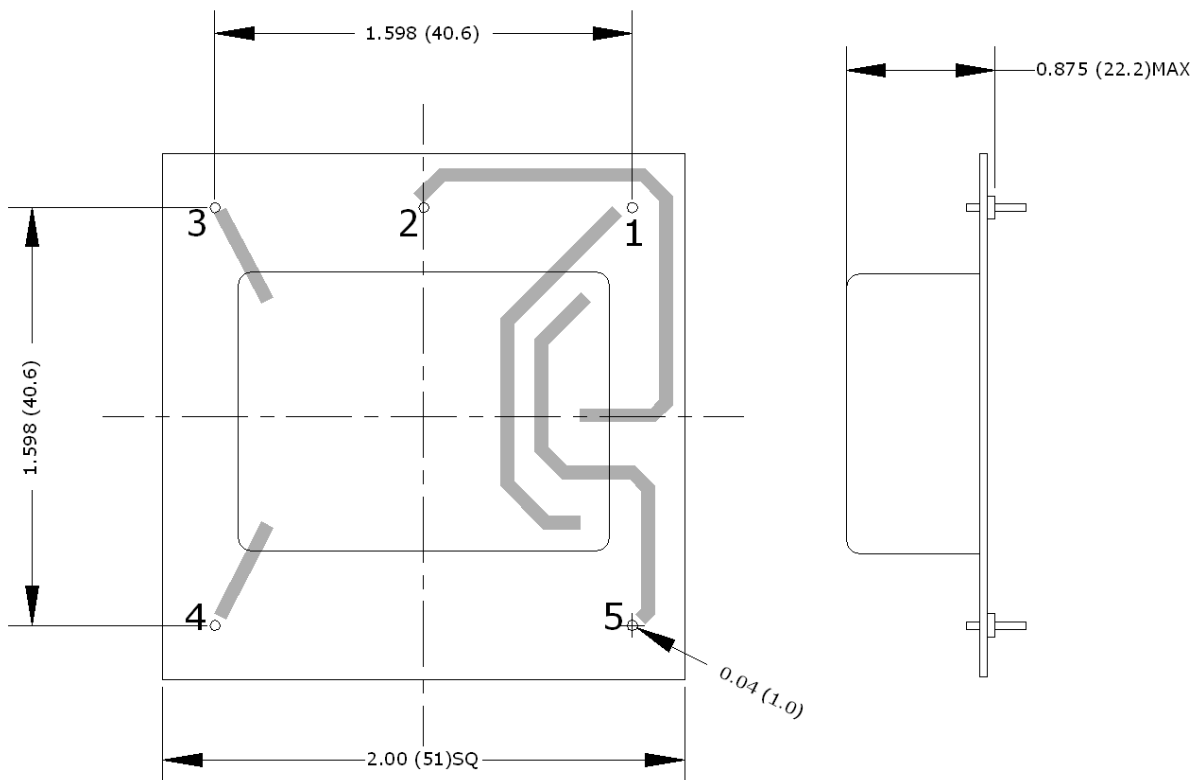
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**Notes:**

- 1\* For highest operating temperature higher than 70°C, the power consumption will be higher (about 20% for 85°C). Values listed are for test in still-air environment, the values will go up while test in still air environment, the values will go up while testing in the temperature chamber.
- 2\* It is recommended to specify Slope option “N” for Ultimate Phase noise performance. For recommended phase noise test, contact factory. It’s assumed that phase noise test is performed under static conditions (no vibration), in still air, and care is taken for minimizing EMI.
- 3\* Longer storage time, especially at low temperatures, may affect both retrace and setability parameters. It may require a few days on power for re-stabilization.
- 4\* All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal Load.
- 5\* Older and stock units may have MBW of 150Hz Max.

**Optional adapter for 2”x 2” compatibility:**



Pin #	Function
1	Vc
2	Vref
3	Output
4	GND
5	Vcc

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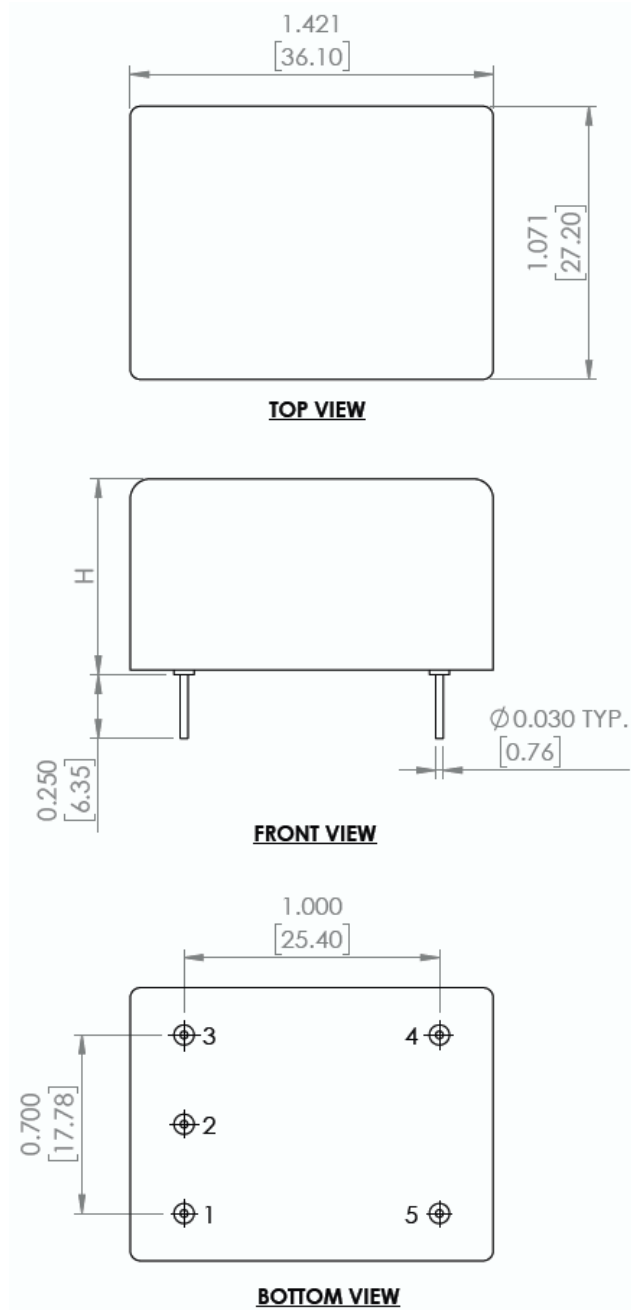


ESD Sensitive

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## Mechanical Dimensions



Height H is 0.75” TYP-standard.

For special requirements, 0.63” TYP height can be considered – consult factory.

Pin #	Function
1	Vc
2	Vref
3	Vcc
4	Output
5	GND

Dimensions: inches [mm]